

فريق تسجيلات عشيرة الجبال ٢١

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نتمنى لكم النجاح و التوفيق

الله

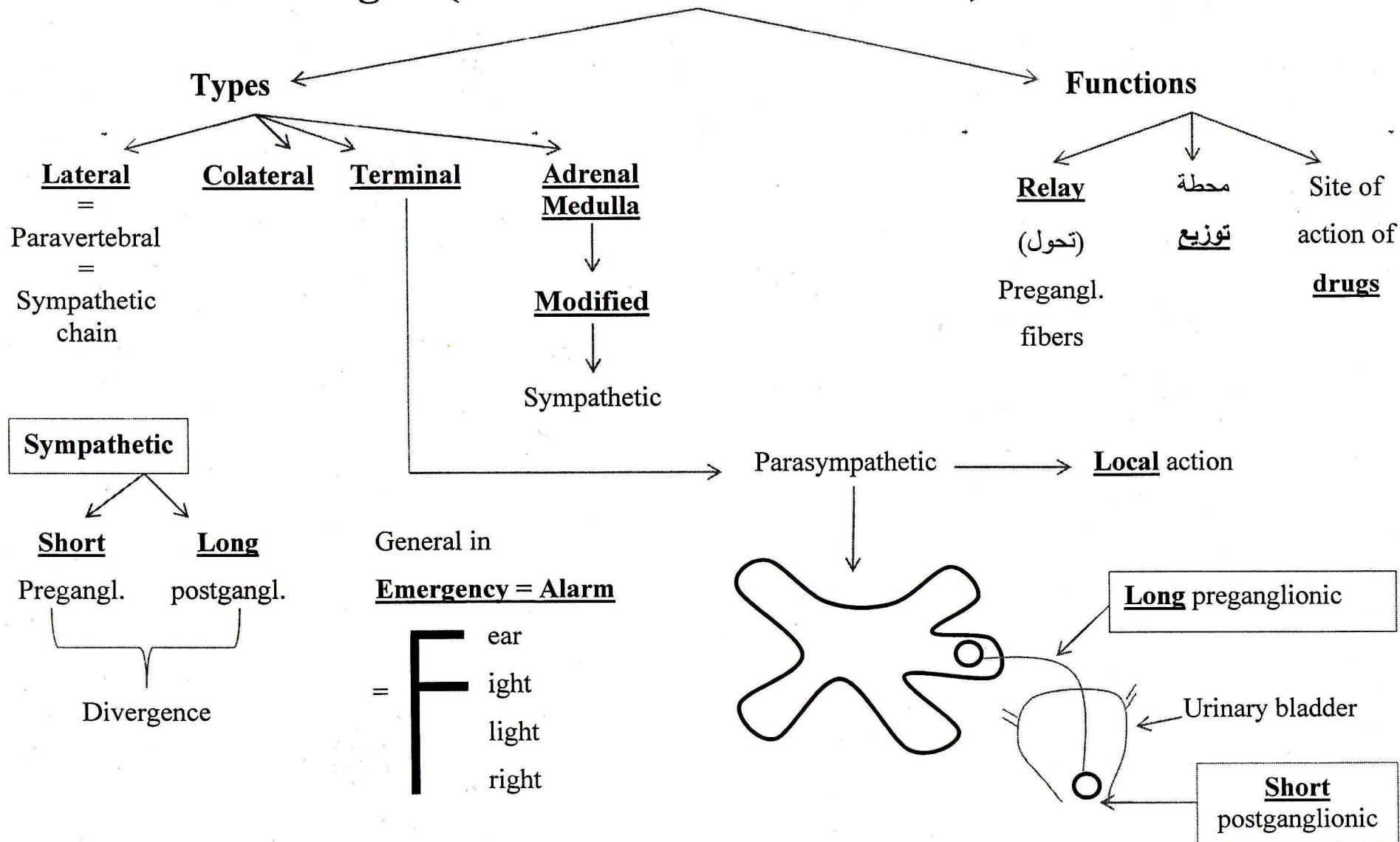
الوطن

الخدمة العامة

VISIT...

LANZAROTE
Caliente.COM

د. محمد فايز (Nerve Cells Outside CNS) Ganglia

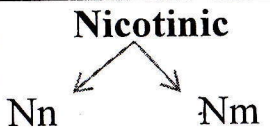


	Sympathetic	Parasympathetic
Origin	LHC of Thoracolumbar segments 	Cranio sacral
<u>Actions</u> General	Sympathetic tone ↓ Mild vasoconstriction ↓ Average BP (120/80)	Parasymp. Tone ↓ HR from 110 to 70 bpm
Head, Neck	1) Eye 2) Saliva → viscid → contrac. Myoepithelial cells around acini 3) BV → VC 4) Sweating Horner Syndrome	العكس (Symp.) Parasymp. ملاحظة: يساعد في (cooperation) Saliva

	Sympathetic	Parasympathetic
Respiratory	Broncho dilatation VC pulmonary artery	العكس
CVS	A) ↑ Cardiac Excitability Conduction Rhythmicity Contraction force ملاحظة هامة ↑ HR ↓ Chronotropic ↑ Force of contraction ↓ Inotropic B) Vascular: VD coronary Direct Indirect	العكس → Vagus العكس

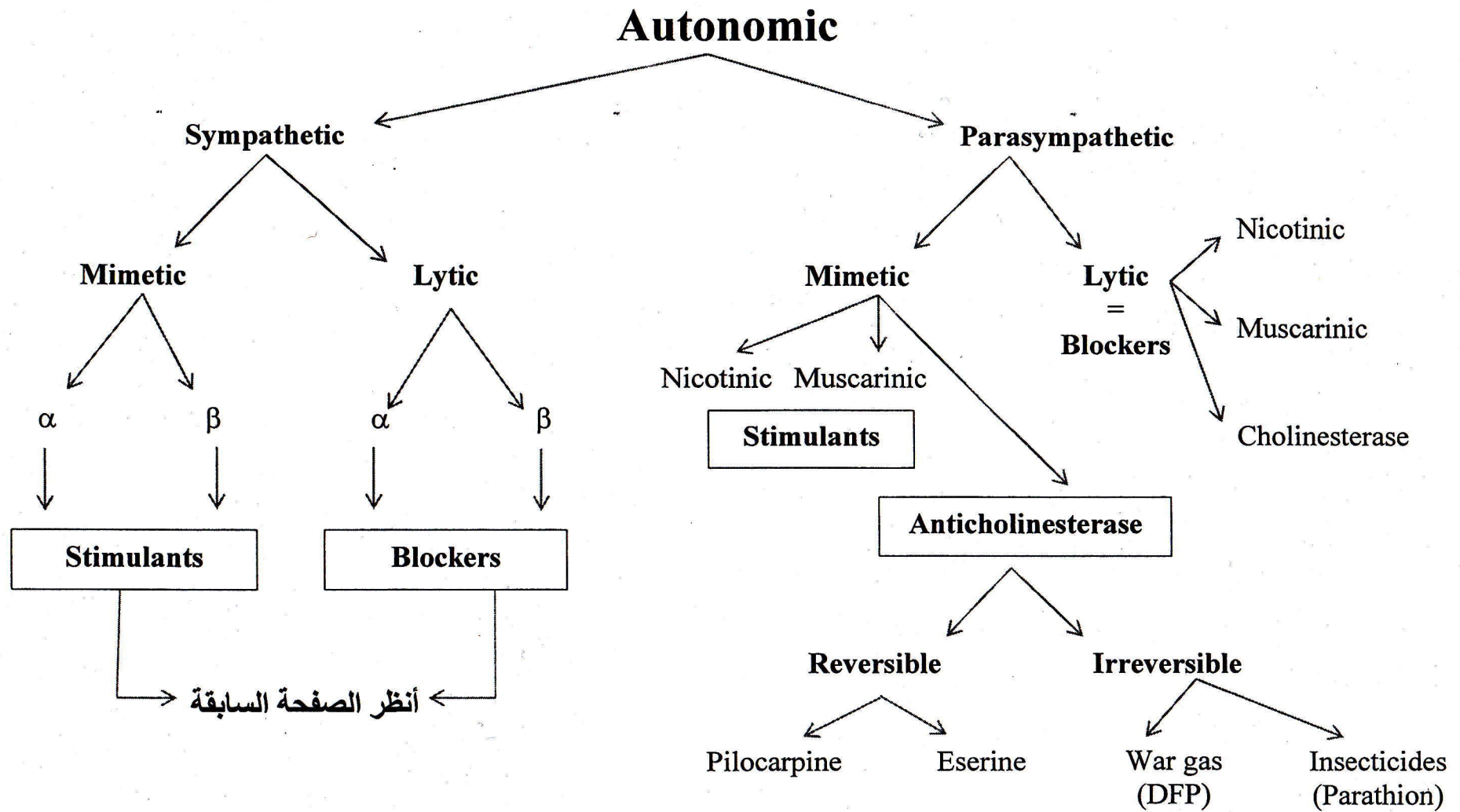
	Sympathetic	Parasympathetic
<u>GIT</u>	Greater splanchnic	Vagus
1. Stomach	Relax wall, contract sphincter	Digestion, Motility العكس يعمل
2. Liver	Glycogenolysis	--
3. Gall bladder	Relax wall, contract sphincter	Bile العكس هيفرز
4. Spleen	Contraction	---
5. Kidney	↑ Renin secretion	
6. BV	VC	VD
<u>Pelvis</u>	← Lesser splanchnic →	← Pelvic nerve →
1. Rectum	Relax wall, contract internal sphincter	Defecation العكس يعمل
2. Urinary bladder	Relax wall, contract internal sphincter	Micturition العكس يعمل
3. Genitalia	Ejaculation (النهاية)	Erection (البداية)
Organs only supplied by	S kin keletal ms VC pleen upra renal + Ventricles + Pupilodilator	Pupilo constrictor Oesophagus Gastric Glands

Autonomic Receptors

	Acetyl choline		Nor adrenaline			
Site	Nicotinic	Muscarinic	$\alpha 1$	$\alpha 2$	$\beta 1$	$\beta 2$
	 * NMJ * Ganglia * Adrenal medulla	* M1 : Brain * M2 : Heart * M3 : Smooth ms	* Wall of BV * Spleen * Sphincters	* Presynaptic * Platelets	* Heart * JGA * Fat tissue	Smooth ms of BV Bronchi
Structure	Ionotropic	 Serpentine				
Mechanism	Na ⁺ influx → Depolarisation		↑ Ca ⁺⁺	↓ c.AMP	↑ c.AMP	↑ c.AMP
Stimulated by	* Acetyl choline * Nicotine small dose	* Acetyl choline * Muscarine	← Adrenaline NA يمسك في $\alpha 1$ اقوى * Phenyl ephrine	فيهم NA , ولكن * Clonidine	يمسك * Propranolol	→ كلهم Adrenaline في $\beta 2$ اقوى * Salbutamol
Blocked by	* Nicotine large dose * Curare * Hexamethonium	* Atropine استخداماته: 1. Preanesthesia 2. Fundus 3. colic علاج	Phentolamine	Yohimbine	Inderal	Butoxamine

Chemical Transmitters

	Acetyl choline	Noradrenaline
Synthesis	Choline + Acetyl CoA ↓ Acetyl choline	Tyrosine ↓ DOPA ↓ Dopamine ↓ Noradrenaline → Adrenaline
Site of release	• <u>All preganglionic.</u> • <u>All post ganglionic parasymp.</u> • <u>Some post ganglionic symp.</u> (sweat gl., BV of coronary, skeletal).	• Post ganglionic sympathetic. • Adrenal medulla (20%).
Actions	Parasympathetic (أنظر ما سبق)	Sympathetic (أنظر ما سبق)
Receptor	أنظر الصفحة القادمة	
Removal	← Active • Cholinesterase - True - Specific - RBCs - Pseudo - Not Specific - Plasma	Reuptake → • MAO. • COMT. • VMA.



د. محمد فايز Notes

Sympathetic and Parasympathetic

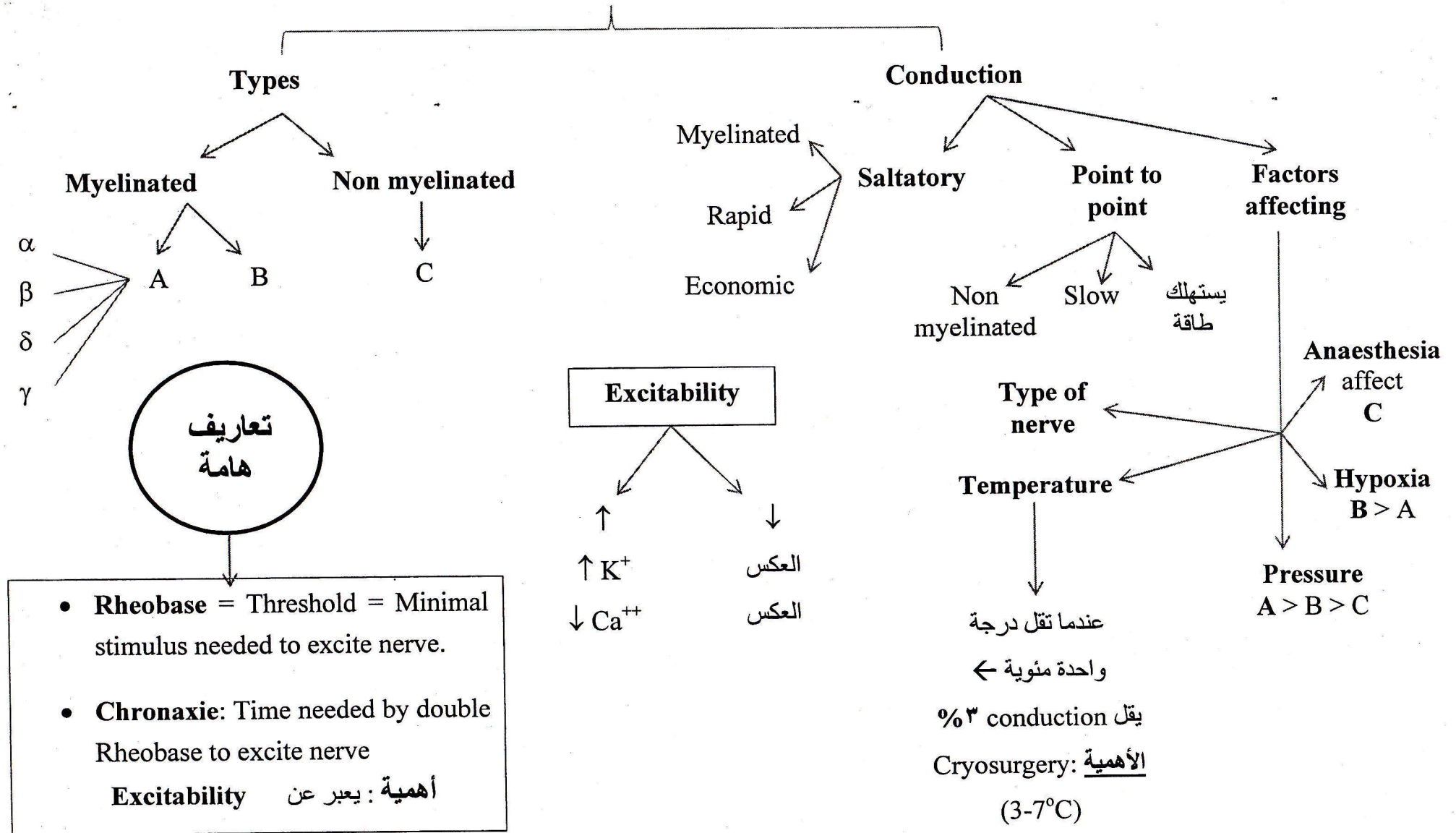
→ **C** omplementary → **S** alivary gland
o operative → **S** ex organs

Exercise

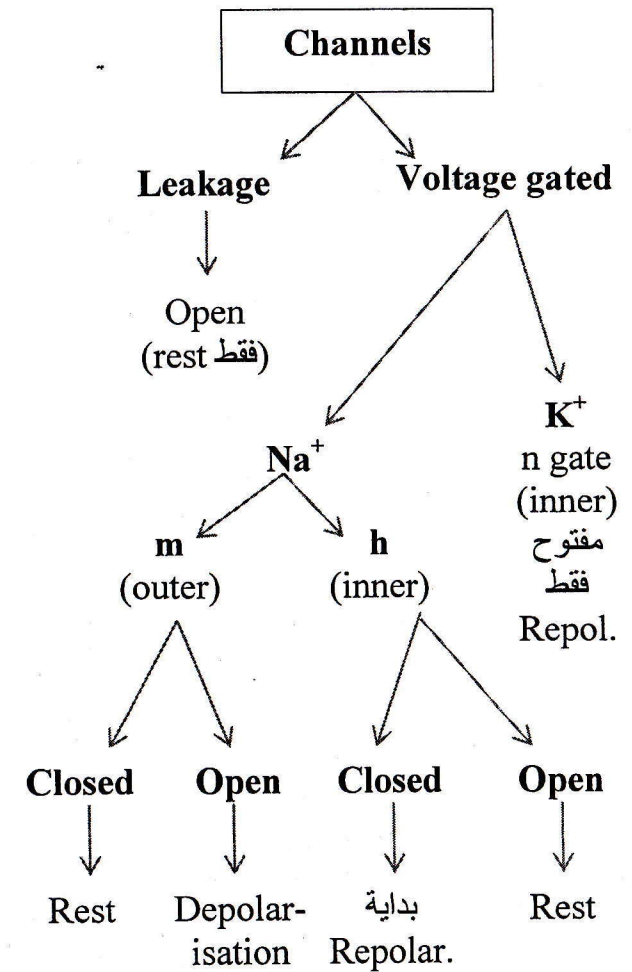
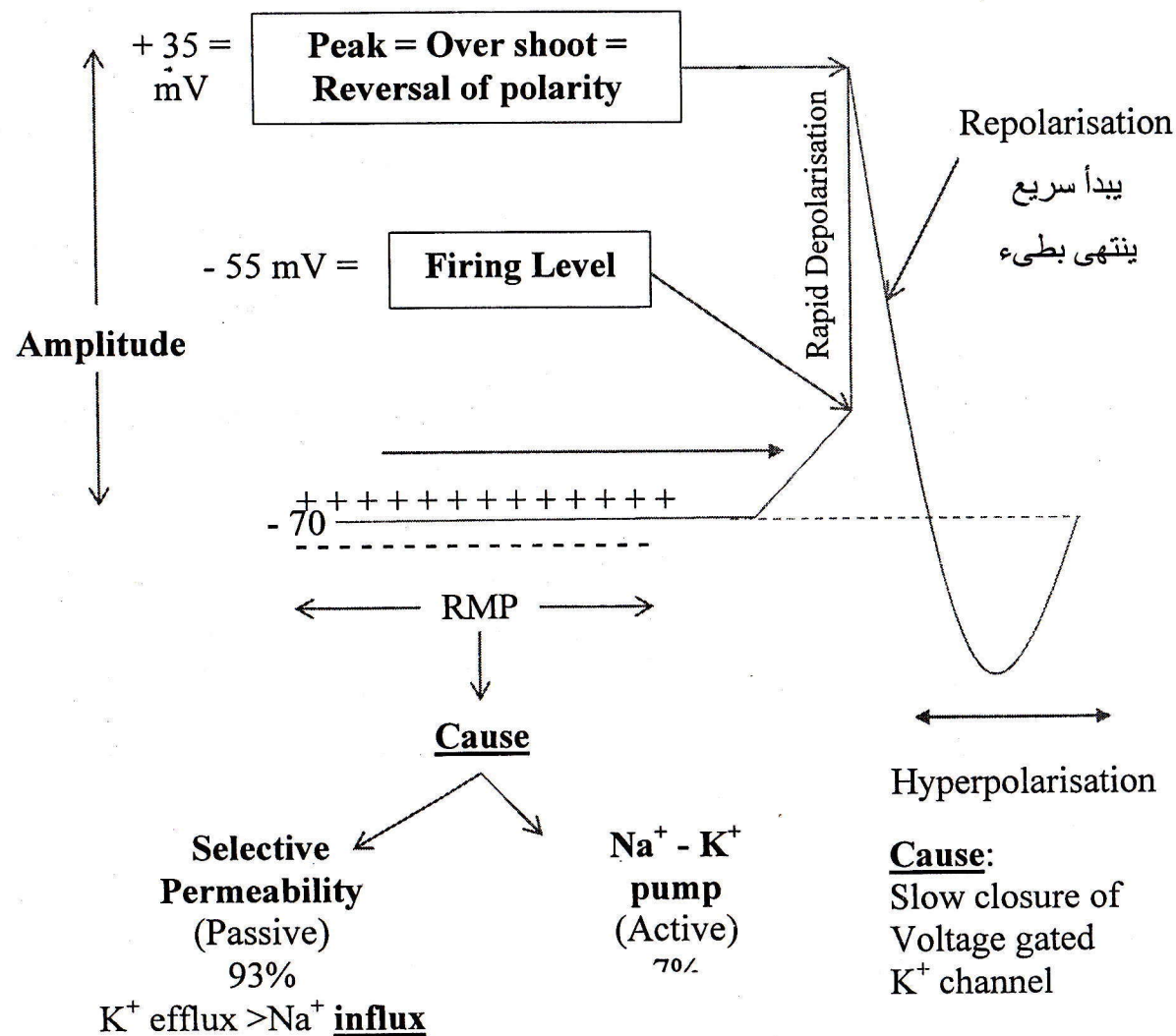
- ↑ Lipolysis.
- VD of skeletal ms arterioles.

↓
Orbelli effect

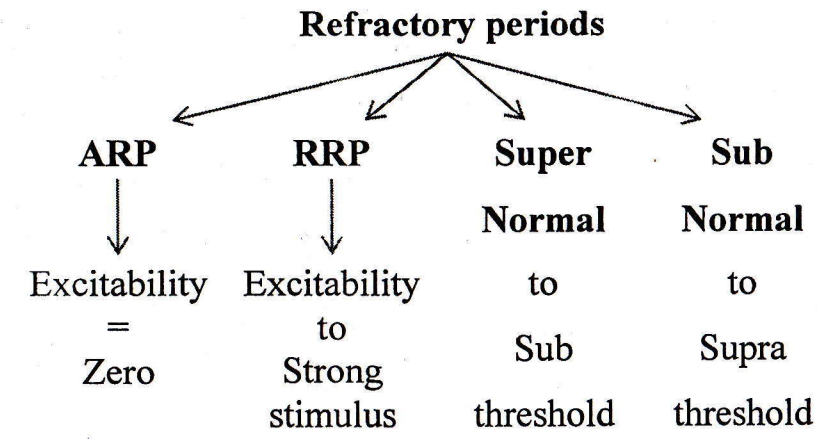
د. محمد فايز Nerve



د. محمد فايز Action Potential



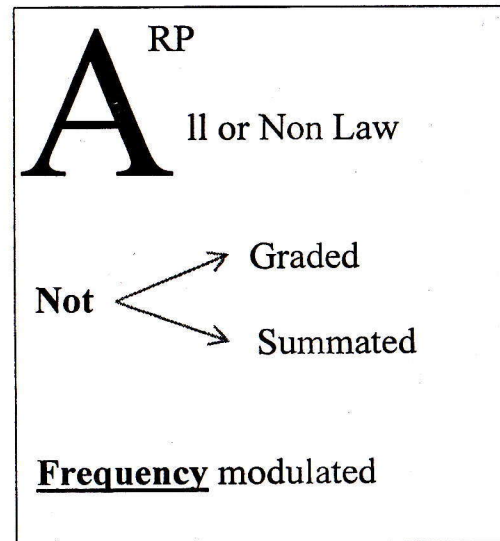
د. محمد فایز Action Potential



ARP → All Depolarisation + upper 1/3 Repolarisation

RRP → Lower 2/3 Repolarisation

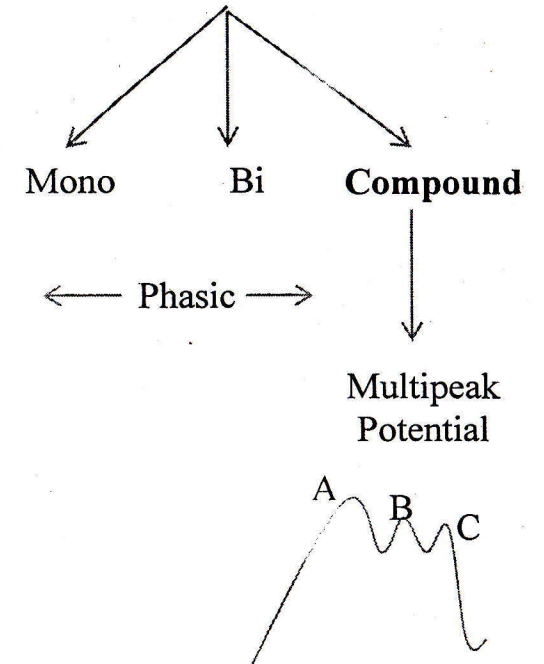
Characters



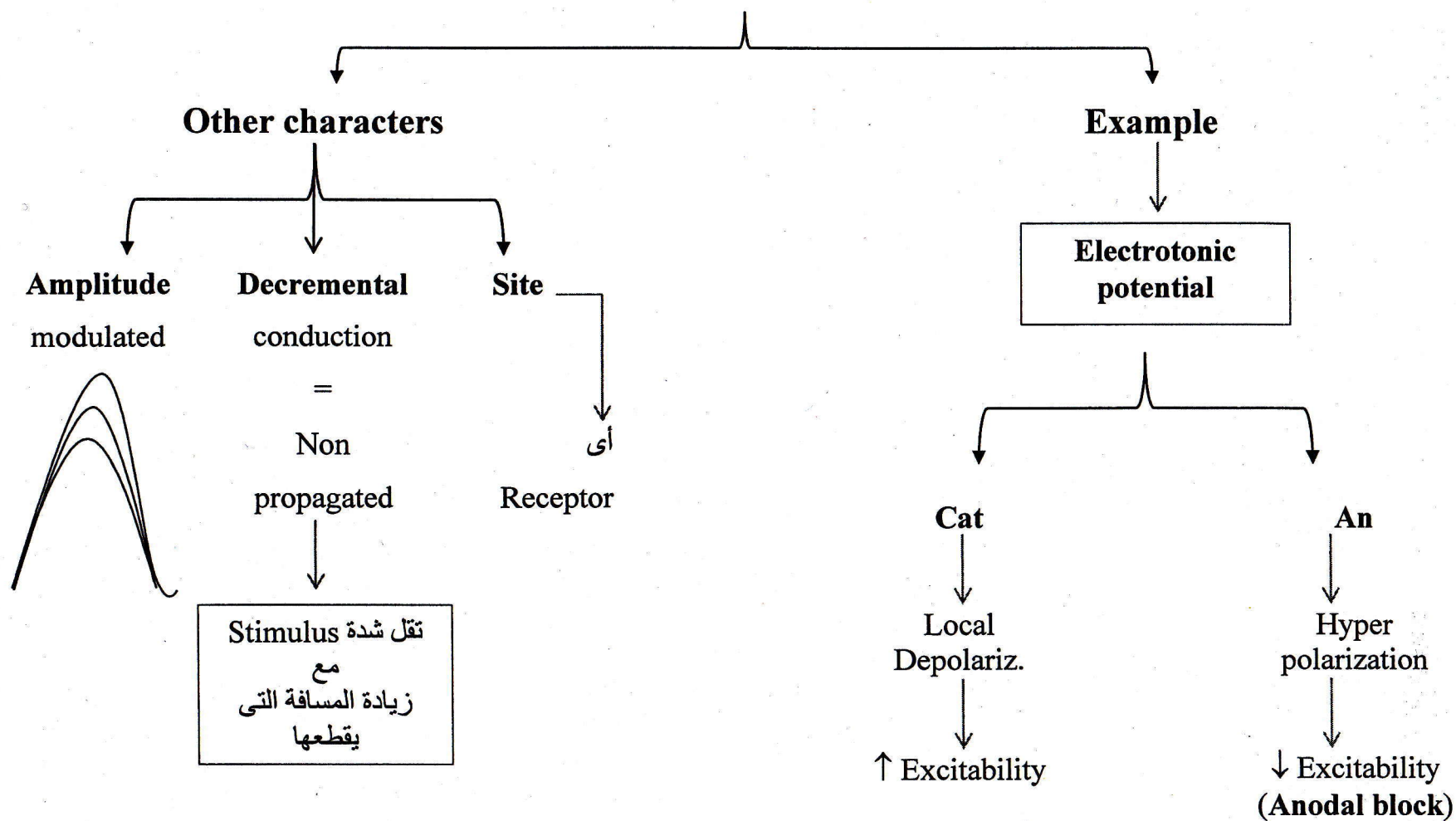
عکس

Local potential

Types



د. محمد فايز Local Potential



د. محمد فايز Effects obtained from different stimuli applied on mixed nerves

	Subthreshold	Threshold	Supathreshold	Maximal	Supramaximal
Excitability	--	Small number of nerve fibers	Great number of nerve fibers	All nerve fibers	Each nerve fiber obeys all or none law
Potential changes recorded	--	Small	Large	Maximal	No further ↑

Potential nerves recorded represent algebraic summation of "all or none" action potential of many nerve fibers

د. محمد فايز Muscle (Excitation contraction coupling)

Action potential opens voltage gated Ca^{++} channels (Nerve)

↓
 Ca^{++} influx

↓
Rupture of Ach. Vesicles

↓
Release of Ach.

↓
Ach. Binds to nicotinic receptors (**MEP**)

↓
AP. Reaches sarcolemma (MS membrane)

↓
Pass through T. Tubes

↓
Opens **DHP Receptor** (voltage sensor)

↓
Opens **ryanodine** Ca^{++} channels (ligand gated) on SR

↓
 Ca^{++} **release** from cisterna (SR)

↓
 Ca^{++} binds to **troponin C**

↓
Removes tropomyosin which covers active sites on actin

↓
Cross bridge cycling

Neuro MS Transmission

1. Unidirectional
2. Delay.
3. Fatigue.
4. Affected by :

Stimulatory

A. Nicotine
small dose

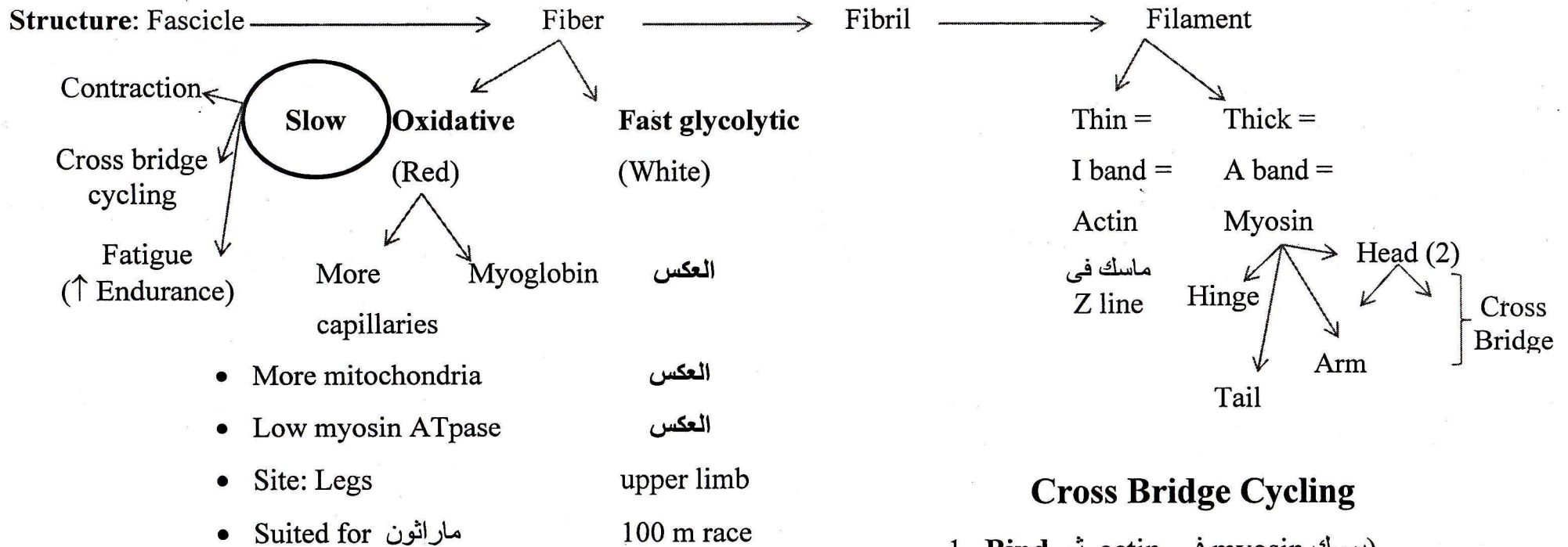
B. Anticholin-
esterase

Inhibitory

العكس
(+)

-Succinyl choline.
-Botulinum toxins

د. محمد فايز Muscle



Notes:

1. Walk along theory:

Ca^{++} binds to troponin C → remove tropomyosin

→ Cross bridge cycling.

2. Contracture: continuous contraction without relaxation.

Cross Bridge Cycling

1. Bind (يمسك myosin في actin ثم)

(يشده جوه ناحية Sarcomere center)

2. Bend (power stroke).

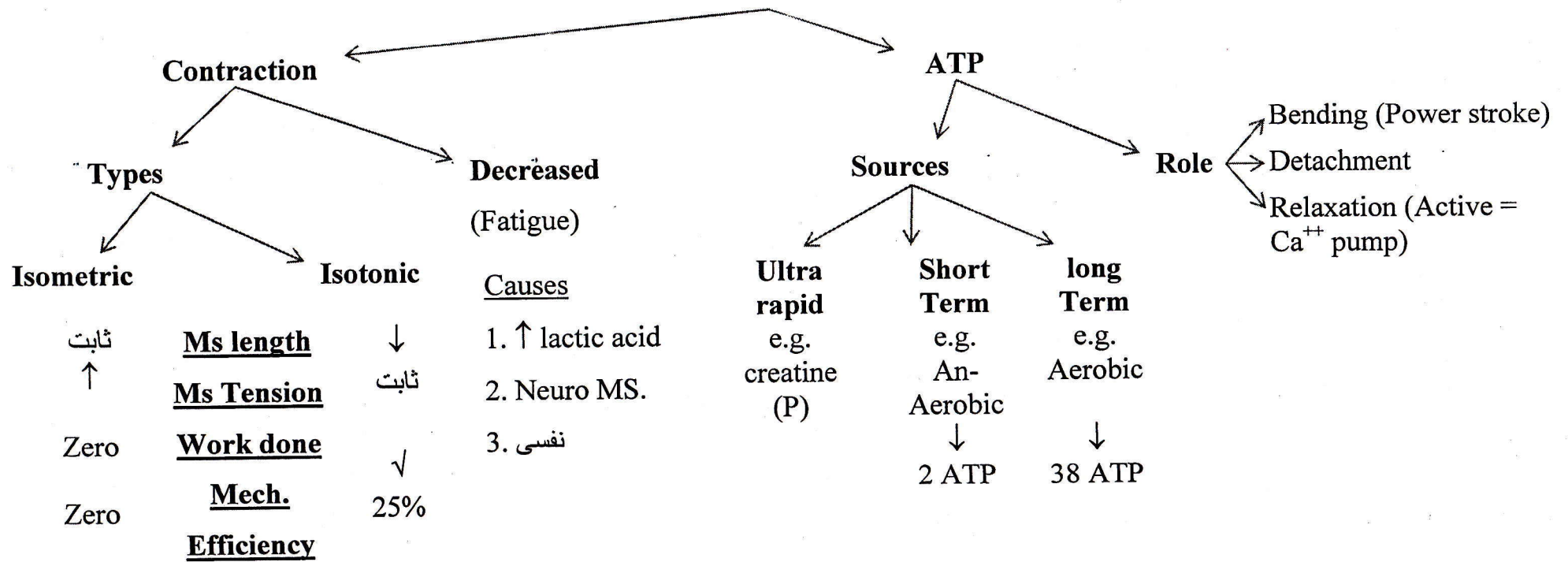
3. Detachment:

إذا لم ينفصل myosin head عن Actin

← Rigor mortis (بعد الوفاة)

4. Recycling.

د. محمد فايز Muscle



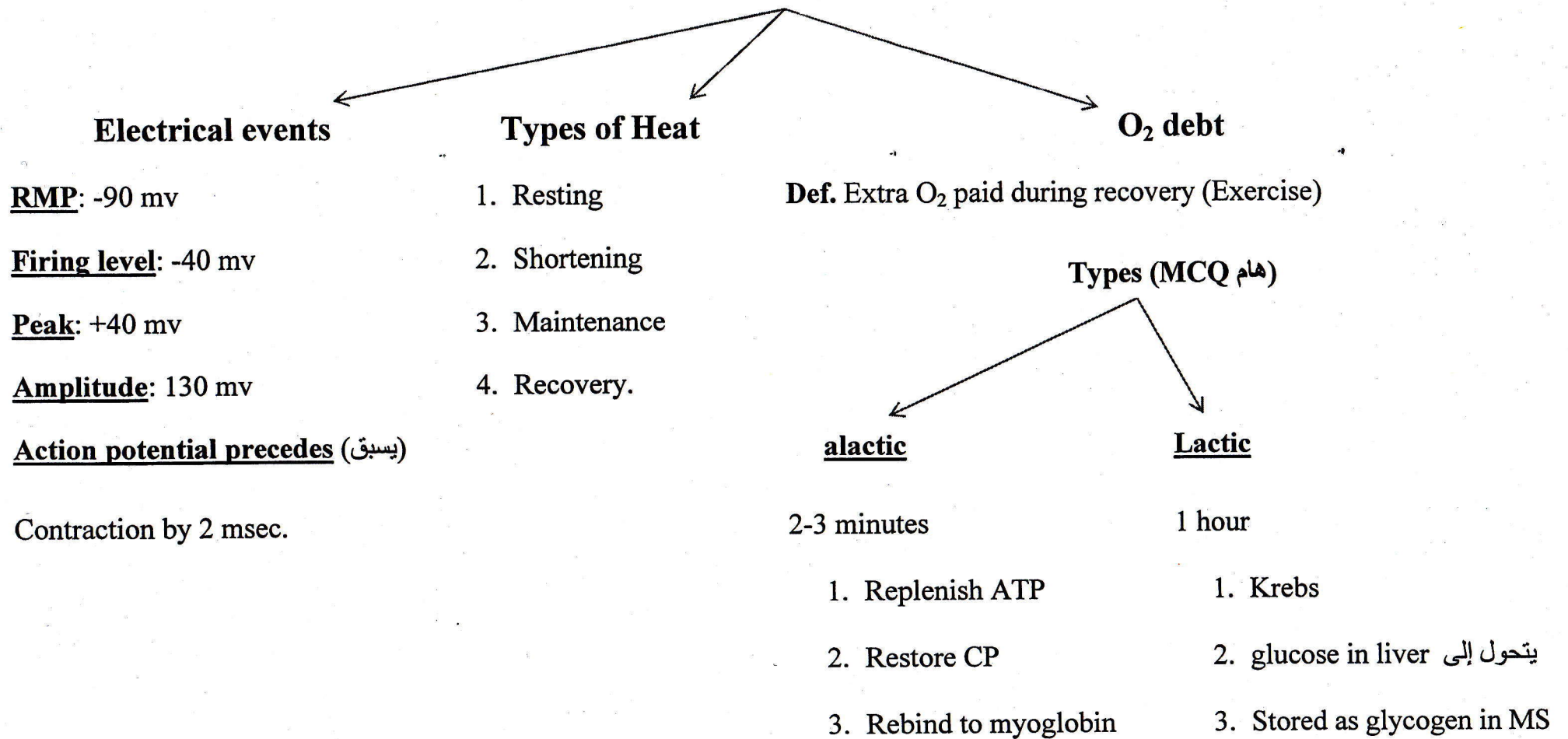
N.B.: Myasthenia Gravis (Autoimmune disease)

Weak contraction caused by antibodies against

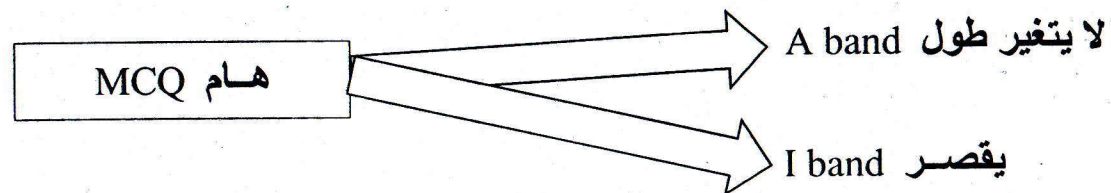
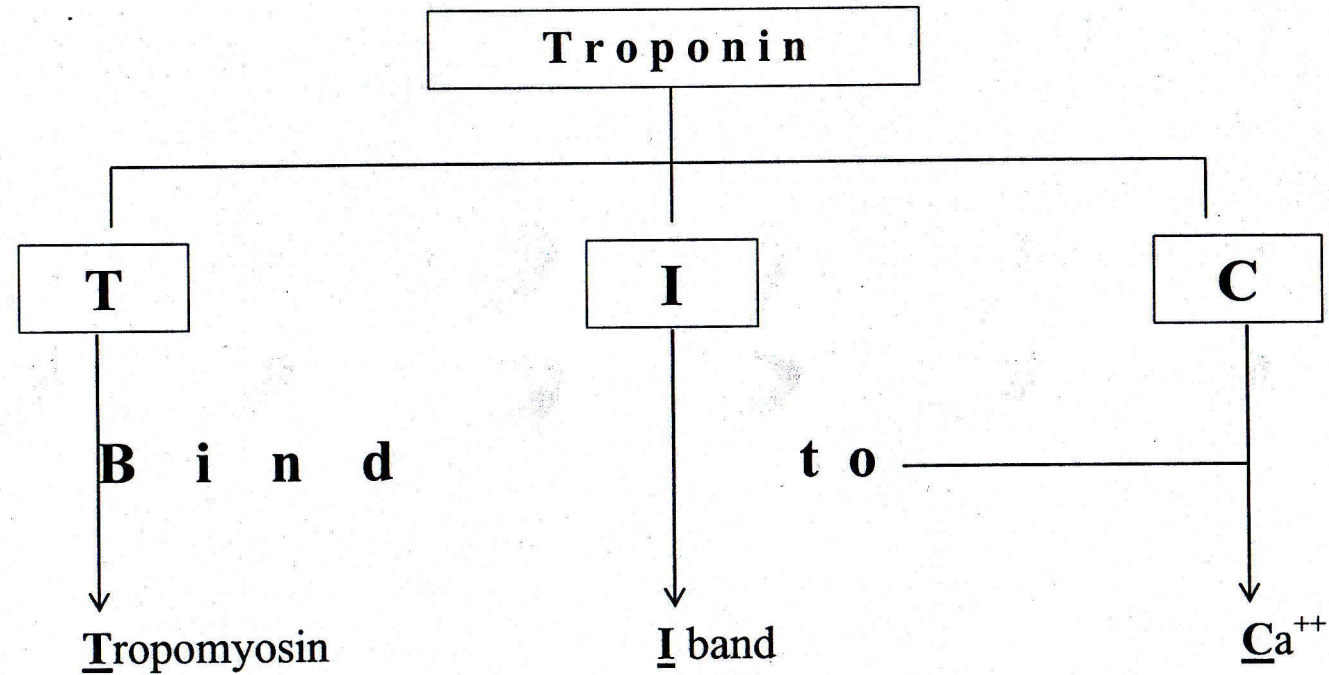
Some Nicotinic receptors at MEP.

Treated by: Neostigmine

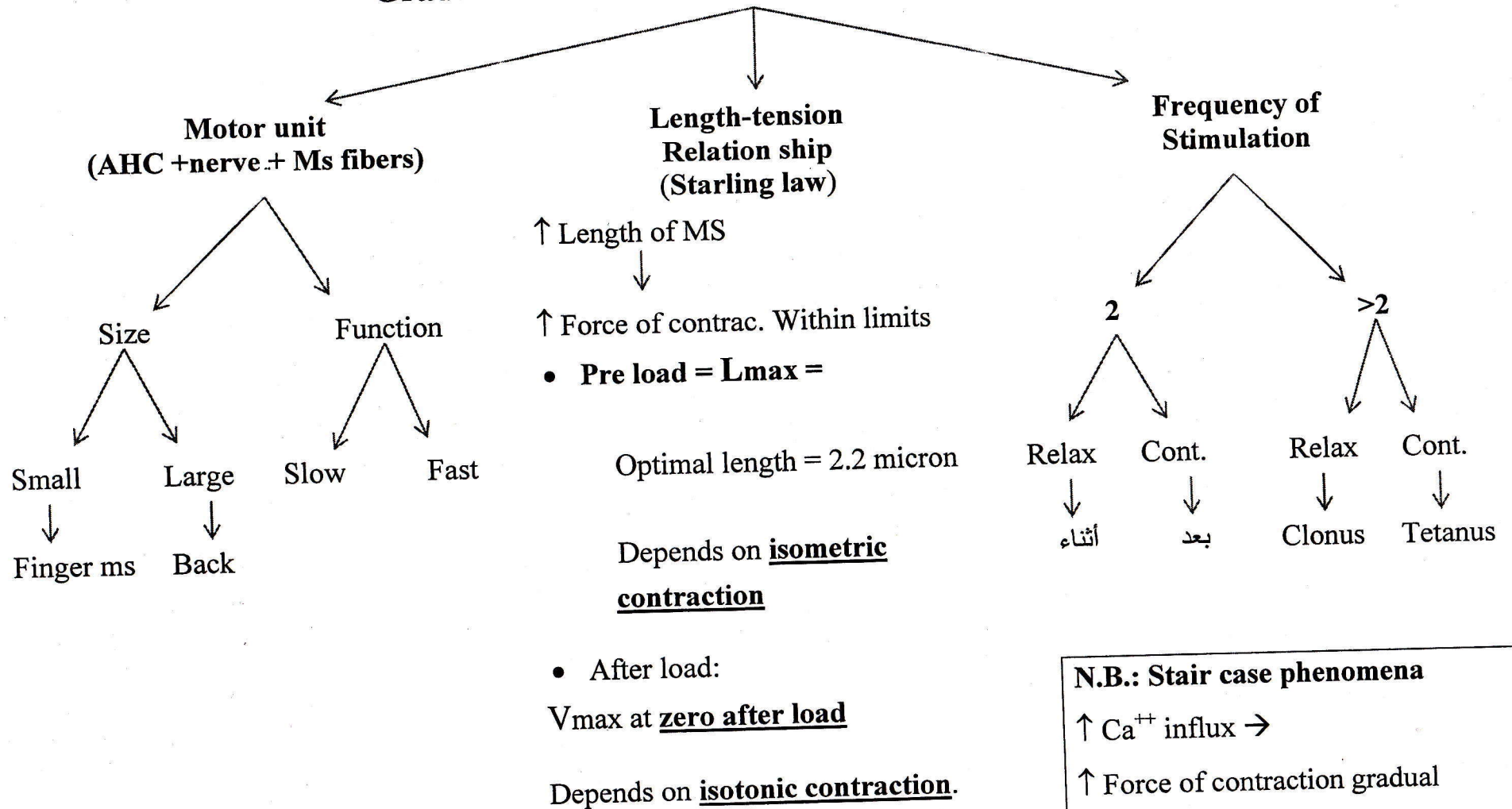
د. محمد فايز Muscle



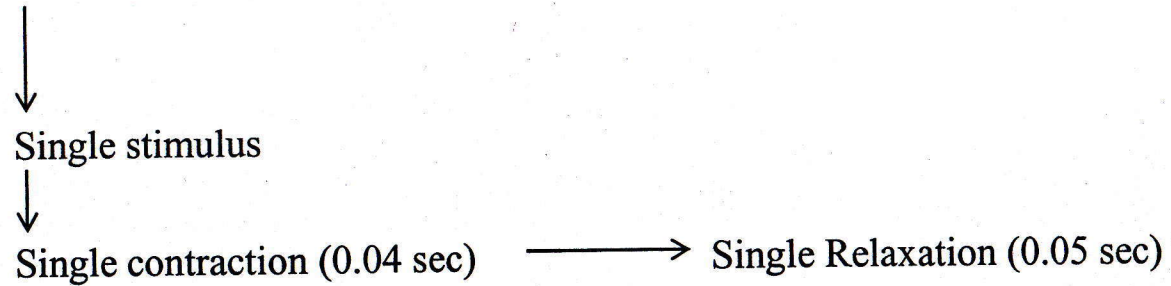
د. محمد فایز Notes on Excitation Contraction Coupling



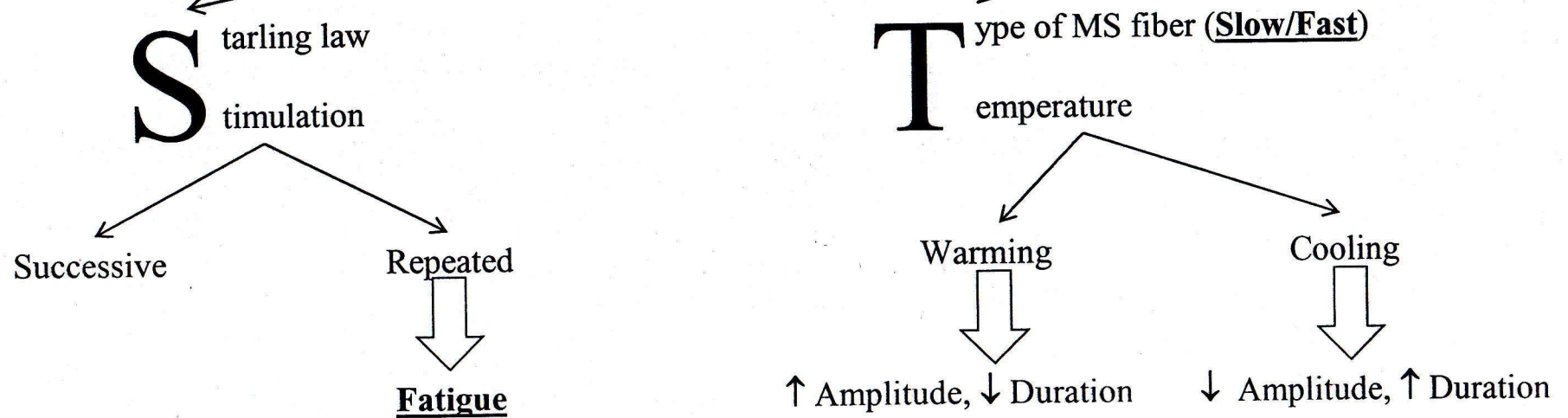
د. محمد فايز Gradation/. of skeletal ms contraction



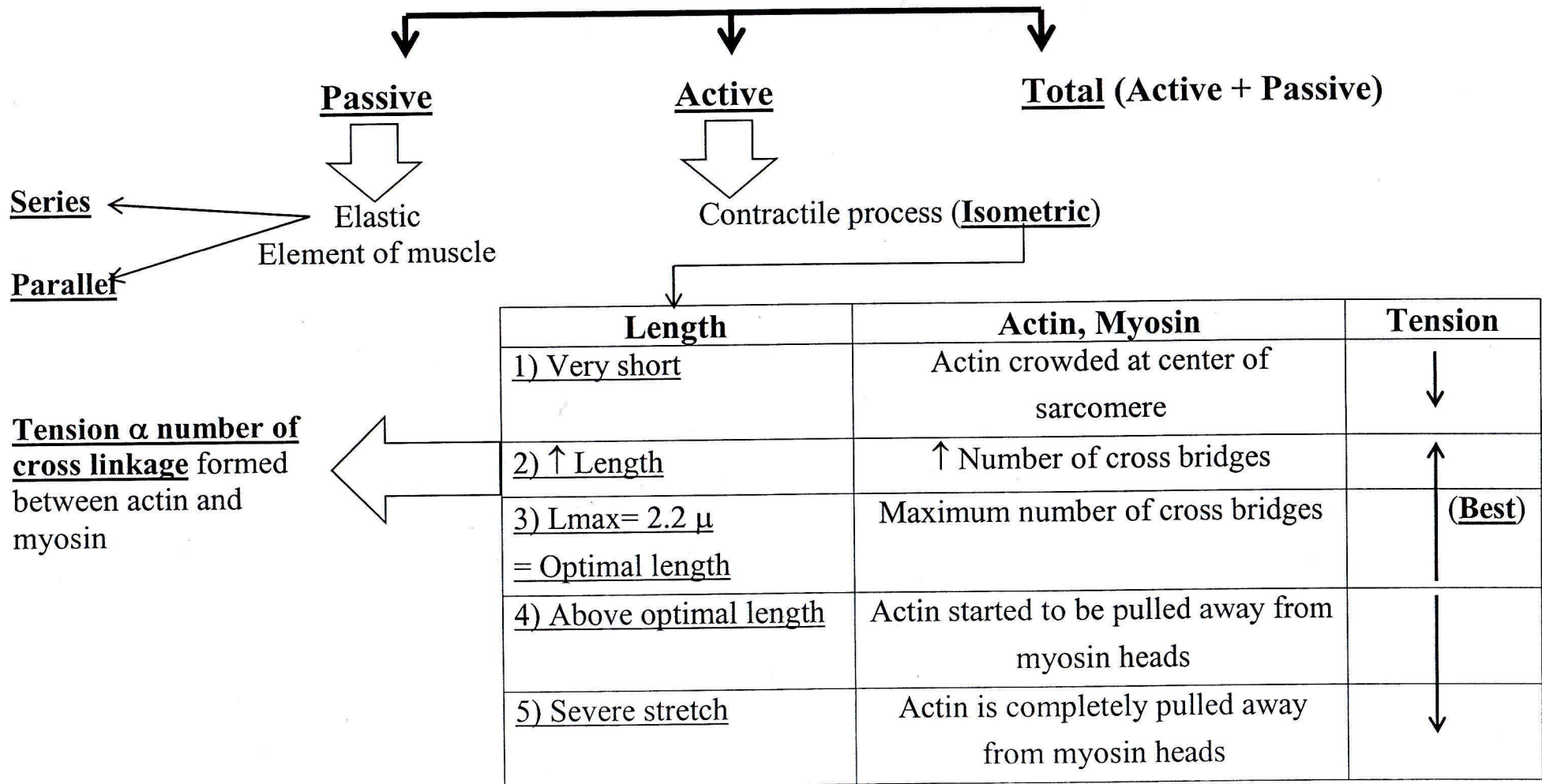
Simple Muscle Twitch (SMT) د. محمد فايز



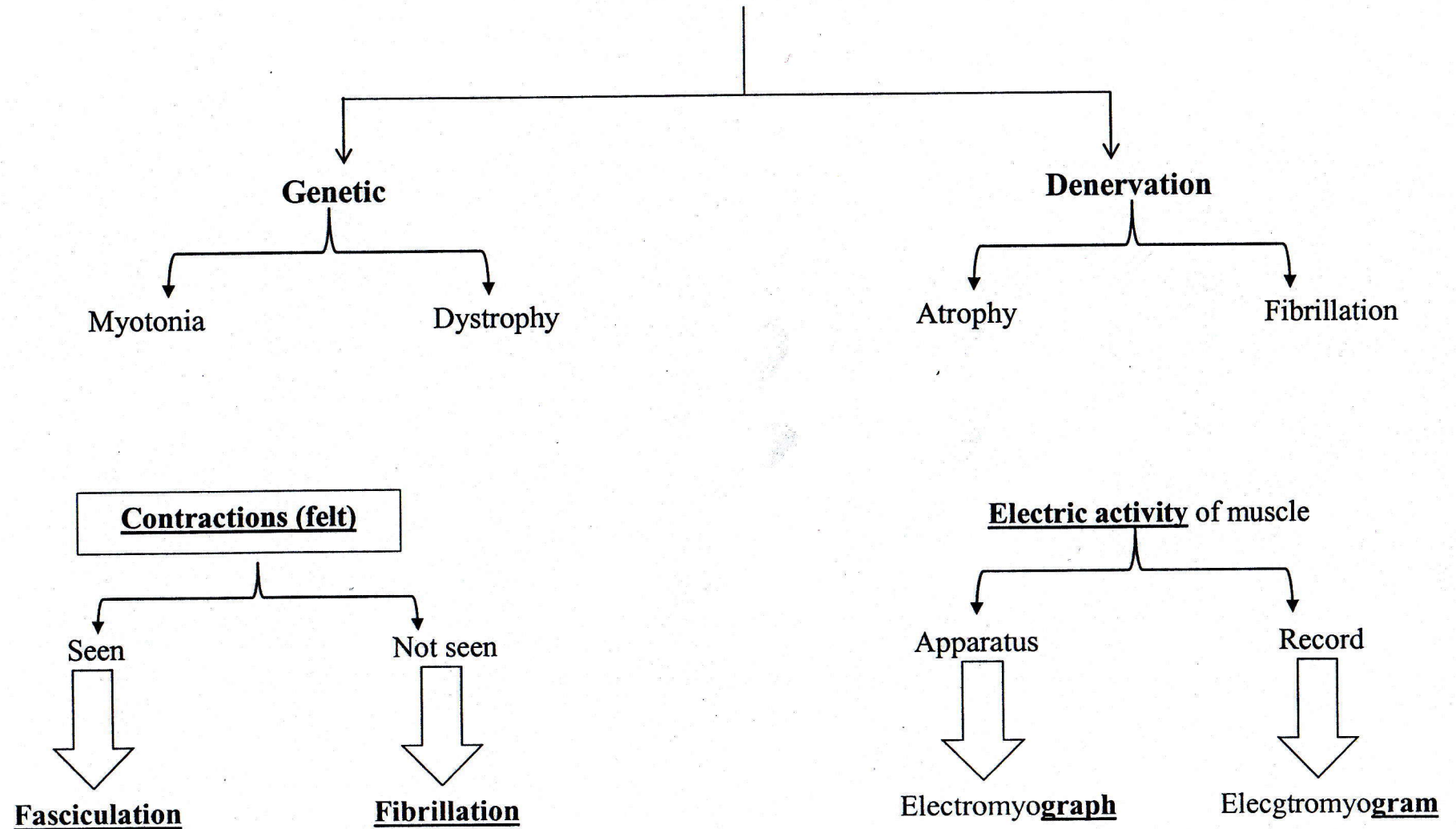
Factors affecting SMT



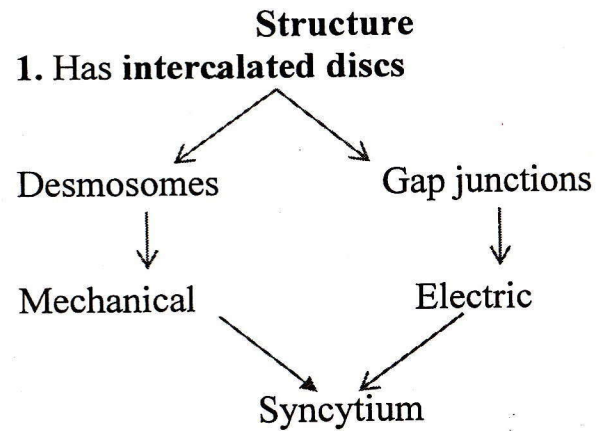
د. محمد فايز Length-Tension Relationship



د. محمد فايز Muscle Diseases



د. محمد فايز Cardiac muscle



2. Poor developed Sr.

3. زي Skeletal ms عندها

Actin

Myosin

Z line

Troponin

Tropomyosin

Excitation Contraction Coupling

نفس خطوات

Skeletal ms

مع فارق هام

يعتمد القلب على

ECF Ca^{++}

(Trigger = induced Ca^{++})

Which stimulates Ca^{++} release

From SR →

Ca^{++} induced Ca^{++} release

N.B.: Relaxation

Ca^{++} uptake

(Ca^{++} pump)

$\text{Na}^+ - \text{Ca}^+$

exchanger

Length-Tension relationship (Starling law) (MCQ)

When diastolic volume ↑

↑ Force of contraction

Within limits

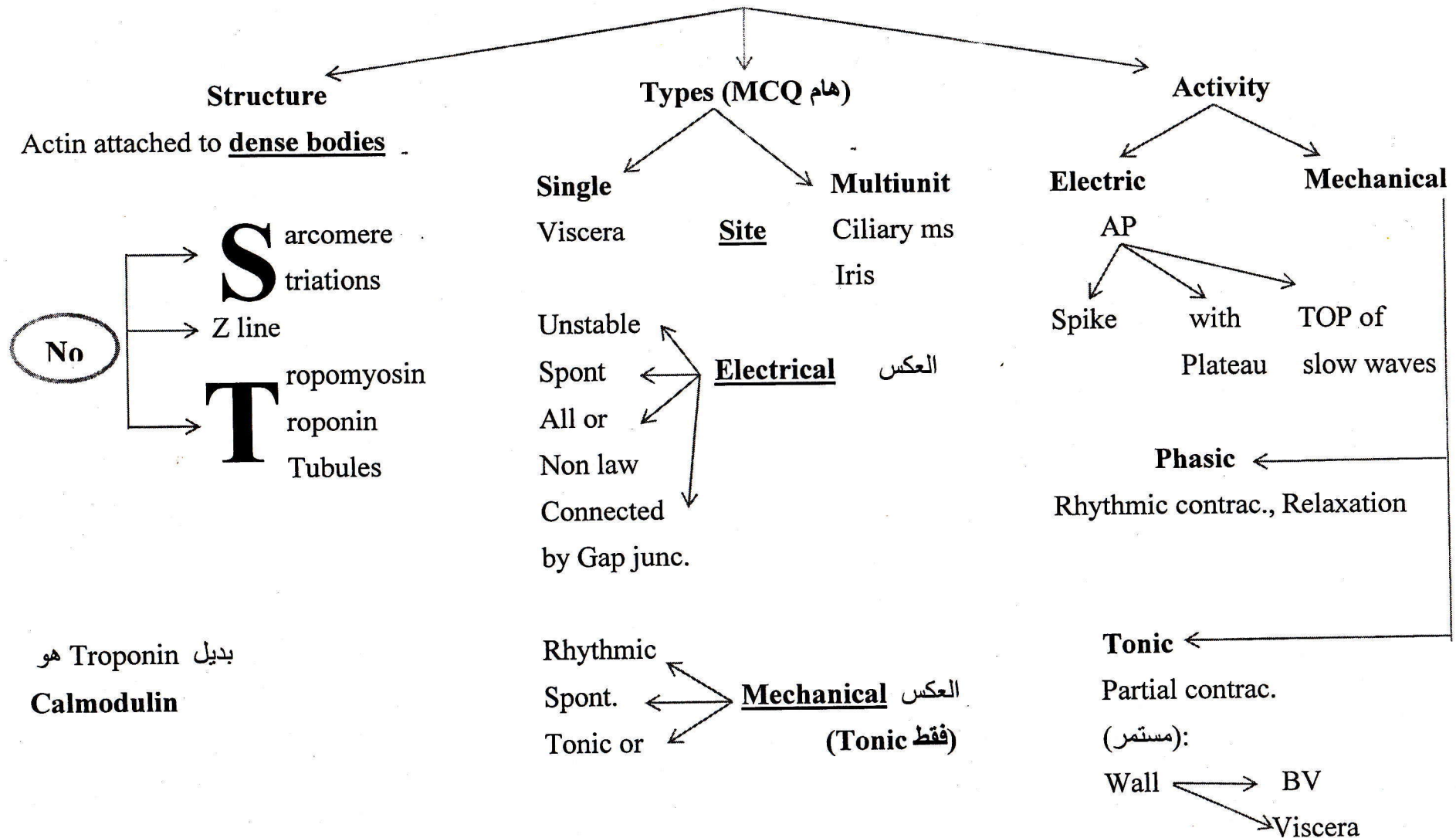
Gradation of
cardiac Ms
contraction

↑ Length

↑ Ca^{++}

No
 O_2 debt

د. محمد فايز Smooth Muscle



Smooth Muscle د. محمد فايز

Excitation contraction

Coupling

- Ca^{++} bind to calmodulin



Activates MLCK (on myosin)



Phosphorylates Myosin CB



Myosin twists around actin

(as cork screw)



Contraction

- **Relaxation**

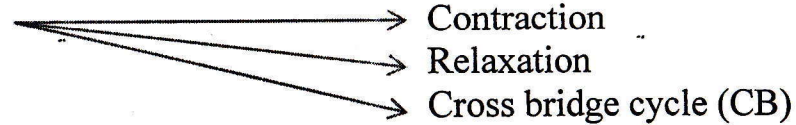


Ca^{++} pump

Myosin phosphatase

Characters

1. Slower



2. Resists fatigue

3. Latch bridge

4. Plasticity

↑ content in viscera without much

↑ in tension

5. Control

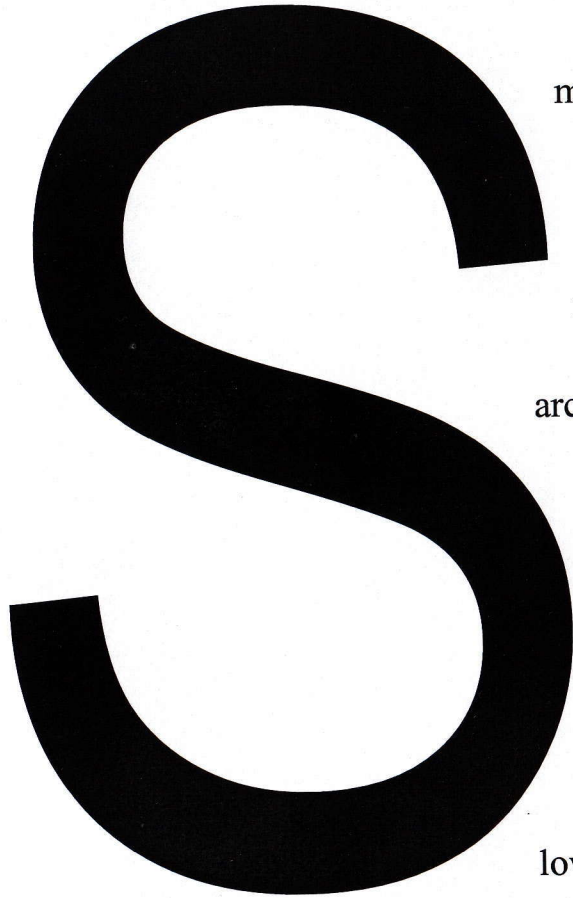
Increased by

- Parasymp.
- Ac. Choline
- Estrogen
- Hyperkalemia

Decreased by

- Symp.
- Nor, Epinephrine
- Progesterone
- hypercalcemia

د. محمد فايز (10 S) Smooth Muscle



small size

striation

sarcomere

} لا يوجد

single unit: Gap junctions

sarcoplasmic reticulum: Poorly developed

source of Ca^{++} : ECF, Ca^{++}

sensor of Ca^{++} : Calmodulin

slow contraction

no spike potential

slow waves

فريق تسجيلات عشيرة الجبال ٢١

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كلية الطب